

**PATENT APPLICATION**  
**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of

BOWERS, RODERICK W. J., et al.

Divisional Application of  
Appln. No.: 08/050,032

Group Art Unit: Not Assigned

Confirmation No.:

Examiner: Not Assigned

Filed: February 28, 2002

For: CONTACT LENS MATERIAL

**PRELIMINARY AMENDMENT**

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

**IN THE CLAIMS:**

**Please cancel claims 1-16 without prejudice or disclaimer.**

**Please add the following new claims:**

**CLAIMS**

17. A contact lens material manufactured from a cross-linked polymer formed by polymer using a mixture of;
- a) a zwitterionic monomer;
  - b) a non-ionic diluent monomer; and
  - c) a cross-linking monomer which forms cross-linking during the polymerisation reaction.
18. A contact lens material according to claim 17 obtained by polymerizing at least 0.2% by weight of said zwitterionic monomer at least 70% by weight of said diluent

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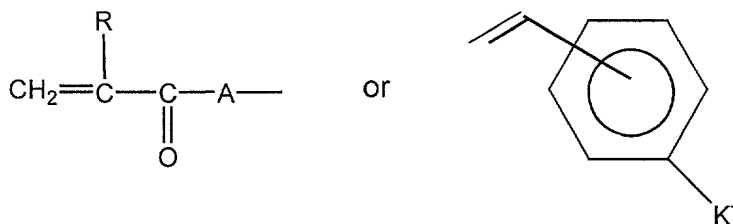
proportions being based on the total weight of monomer.

19. A contact lens material according to claim 17 wherein the zwitterionic monomer has the formula (I):



wherein B is a straight or branched alkylene, oxaalkylene or oligooxaalkylene chain or if X contains a carbon-carbon chain between B and the zwitterionic group or if Y contains a terminal carbon atom, a valence bond,

Y is an ethylenically unsaturated polymerizable group selected from:



wherein

R is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group;

A is -O- or -NR<sup>1</sup>- where R<sup>1</sup> is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group or R<sup>1</sup> is -B-X where B and X are as defined above; and

K is a group -(CH<sub>2</sub>)<sub>p</sub>OC(O)-, -(CH<sub>2</sub>)<sub>p</sub>C(O)O-, -(CH<sub>2</sub>)<sub>p</sub>OC(O)O-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)-, -(CH<sub>2</sub>)<sub>2</sub>C(O)NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)O-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)O-, -(CH<sub>2</sub>)<sub>2</sub>OC(O)NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)NR<sup>2</sup>- (in which the groups R<sup>2</sup> are the same or different), -(CH<sub>2</sub>)<sub>2</sub>O-, -(CH<sub>2</sub>)<sub>2</sub>SO<sub>3</sub>-, or, optionally in a combination with B, a valence bond, and p is from 1 to 12 and R<sup>2</sup> is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group; and

X is a zwitterionic group.

20. A contact lens material according to claim 3 wherein X has the general formula IVB, IVC, IVD, IVE or IVF

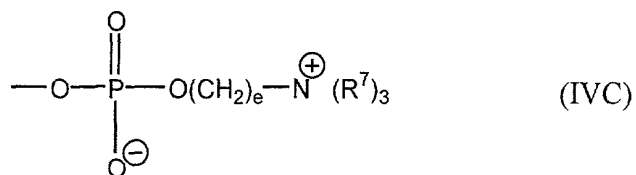
wherein a group IVB has the formula

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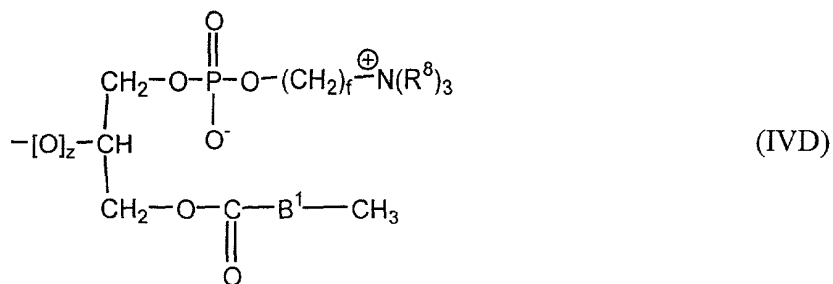
wherein the groups  $\text{R}^6$  are the same or different and each is hydrogen or  $\text{C}_{1-4}$  alkyl and  $d$  is from 2 to 4,

the group IVC has the formula



wherein the groups  $\text{R}^7$  are the same or different and each is hydrogen or  $\text{C}_{1-4}$  alkyl, and  $e$  is 1, 3 or 4;

groups of formula (IVD) have the general formula

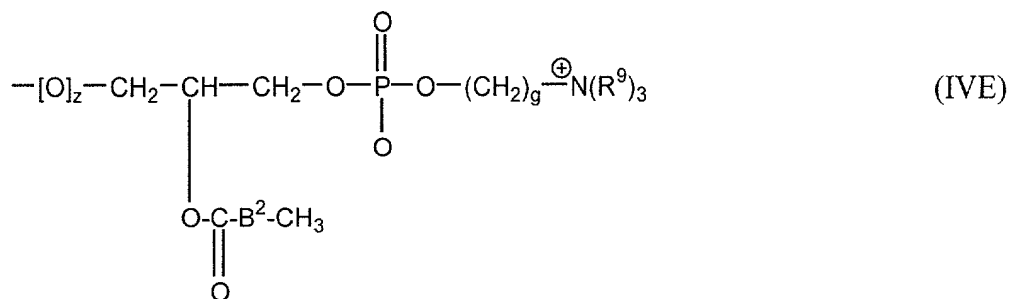


wherein the groups  $\text{R}^8$  are the same or different and each is hydrogen or  $\text{C}_{1-4}$  alkyl,  $\text{B}^1$  is a valence bond or straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group,  $f$  is

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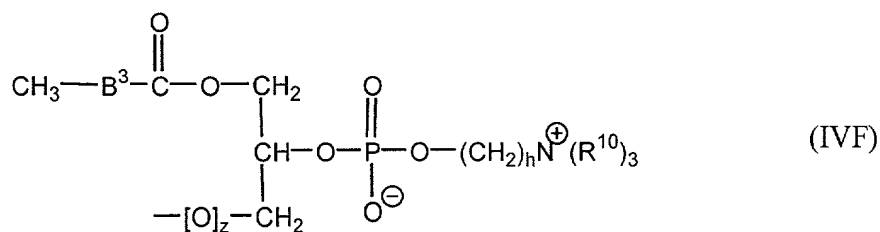
is directly bonded to an oxygen or nitrogen atom and otherwise z is 1;

groups of formula (IVE) have the general formula



wherein the groups  $\text{R}^9$  are the same or different and each is hydrogen or  $\text{C}_{1-4}$  alkyl,  $\text{B}^2$  is a valence bond or straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group, g is from 1 to 4 and if B is other than a valence bond, z is 1 and if B is a valence bond z is 0 if X is directly bonded to an oxygen or nitrogen atom and otherwise z is 1; and

groups of formula (IVF) have the general formula



wherein the groups  $\text{R}^{10}$  are the same or different and each is hydrogen or  $\text{C}_{1-4}$  alkyl,  $\text{B}^3$  is a valence bond or a straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group, h is from 1 to 4 if B is other than a valence bond, z is 1 and if B is a valence bond z is 0 if X is directly bonded to an oxygen or nitrogen atom and otherwise z is 1.

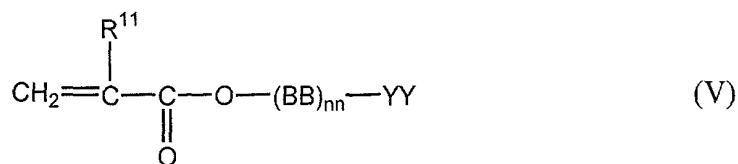
21. A contact lens material, according to claim 20 in which the group X is said group IVC.

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monomer is selected from the group consisting of alkane diol di (alk)acrylates, alkane triol tri(alk)acrylates, alkylene di(alk)acrylamides, alkylene tri(alk)acrylamides, divinylbenzene, and trivinylbenzene.

22 23. A contact lens material according to claim 19 in which the non-ionic monomer is selected from hydroxy C<sub>1-4</sub>alkyl(alk)acrylates and C<sub>1-12</sub>alkyl(alk)acrylates.

24. A contact lens material according to claim 1 wherein the zwitterionic monomer has the formula (V):



wherein BB is a straight or branched C<sub>1</sub>-C<sub>6</sub> alkylene chain optionally interrupted by one or more oxygen atoms;

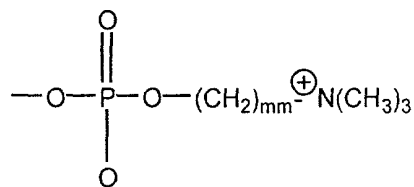
nn is from 1 to 12;

R<sup>11</sup> is H or a C<sub>1</sub>-C<sub>4</sub> alkyl group; and

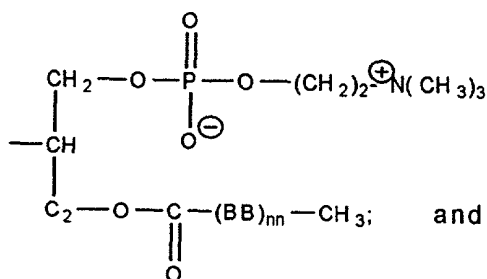
YY is a zwitterionic group.

25. A contact lens material according to claim 24 wherein YY is selected from the group consisting of VIB, VIC, VID and VIE:

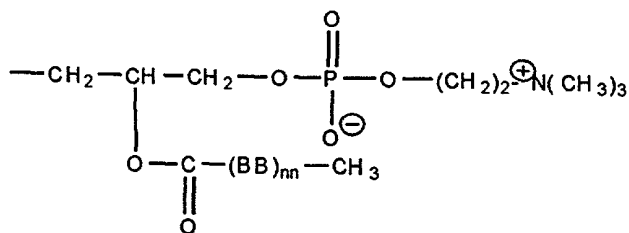




VIC



(VID)



(VIE)

wherein mm is 1 to 4, nn is 1 to 12 and BB is a straight or branched C<sub>1</sub>-C<sub>6</sub> alkylene chain optionally interrupted by one or more oxygen atoms.

- 25 26. A contact lens material according to claim 25 in which YY is a group VIC.
27. A contact lens material according to claim 25 in which the cross-linking monomer which forms cross-links during the polymerization reaction selected from the group consisting of alkane diol di(alk)acrylates, alkane triol tri(alk)acrylates, alkylene di(alk)acrylamides, alkylene tri(alk)acrylamides, divinylbenzene, and trivinylbenzene.
28. A contact lens material according to claim 24 in which the non-ionic monomer is selected from hydroxy C<sub>1-4</sub>alkyl(alk)acrylates and C<sub>1-12</sub>alkyl(alk)acrylates.

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28 29. A contact lens material according to claim 17 which is a xerogel free of water.

29 30. A contact lens formed of a hydrogel comprising a cross-linked polymer and water in an amount from 30 to 80% by weight.

30 31. A process for making a contact lens comprising providing individual monomers (a), (b) and (c), forming a blend of monomers by dissolving components (b) and (c) into monomer (a) in the absence of non-polymerisable diluent, removing oxygen from the solution, and polymerising the blend in a contact lens mold to form a contact lens which is a xerogel wherein

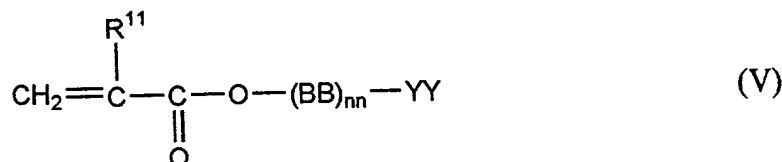
- a) is a zwitterionic monomer,
- b) is a nonionic diluent monomer and
- c) is a cross-linking monomer which forms crosslinks during the polymerisation.

3 32. A process for forming a contact lens material comprising forming a solution of a blend of monomers (a), (b) and (c) in a non-polymerisable solvent, polymerising the monomer blend in a mold and removing the solvent, wherein

- a) is a zwitterionic monomer,
- b) is a nonionic diluent monomer and
- c) is a cross-linking monomer which forms crosslinks during the polymerisation.

3 2 33. A contact lens material manufactured from a cross-linked polymer obtained by polymerizing a mixture consisting essentially of:

zwitterionic monomer of the formula (V):



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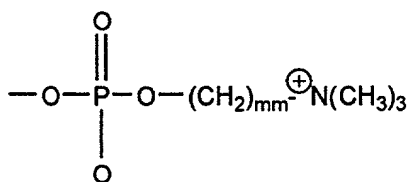
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more oxygen atoms;

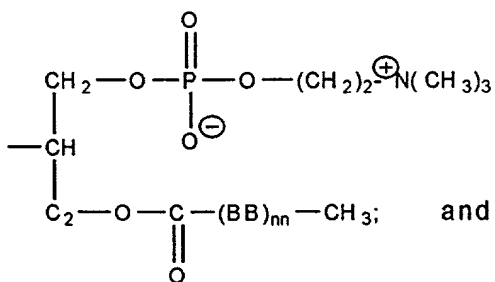
nn is from 1 to 12;

R<sup>11</sup> is H or a C<sub>1</sub>-C<sub>4</sub> alkyl group; and

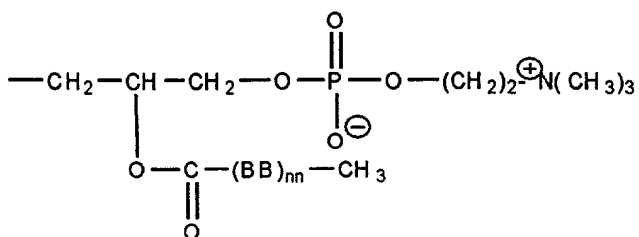
YY is a zwitterionic group which is selected from the group consisting of:



VIC



(VID)



(VIE)



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- ii) a non-ionic diluent monomer; and
- iii) a cross-linking monomer which forms cross-links during the polymerization reaction.

34. A contact lens material according to claim 33, in which the diluent monomer is selected from the group consisting of alkyl (alk)acrylates, dialkylamino alkyl (alk)acrylates, alkyl (alk)acrylamides, hydroxyalkyl (alk)acrylates, N-vinyl lactams, styrene, substituted styrene, and mixtures thereof.

35. A contact lens material according to claim 34, in which the diluent monomer is selected from the group consisting of vinyl pyrrolidone, 2-hydroxyethylmethacrylate, methylmethacrylate and mixtures thereof.

36. A contact lens material according to claim 35 wherein the diluent monomer is 2-hydroxyethylmethacrylate.

37. A contact lens material according to claim 35, wherein the diluent monomer is methylmethacrylate.

38. A contact lens material according to claim 33, in which the cross-linking monomer is a bifunctional or trifunctional cross-linking agent.

39. A contact lens material according to claim 38, in which the cross-linking monomer is selected from the group consisting of ethyleneglycoldimethacrylate, trimethylolpropane trimethacrylate and N,N'-methylenebisacrylamide.

40. A contact lens material according to claim 33, in which YY is a group of formula (VIC).

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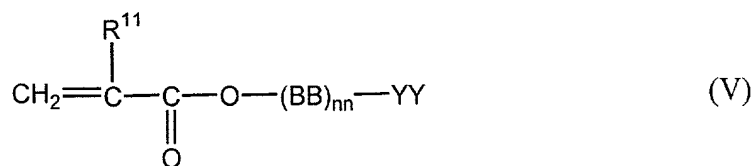
41. A contact lens material according to claim 33, wherein the group  $R^{11}$  is hydrogen or methyl.

42. A contact lens material according to claim 33, in which the zwitterionic monomer of the formula V is 2(methacryloyloxy)ethyl-2'-(trimethylammonium)ethyl phosphate inner salt.

43. A contact lens material according to claim 42, in which the diluent monomer is 2-hydroxyethylmethacrylate.

44. A contact lens formed of a hydrogel comprising a cross-linked polymer obtained by polymerizing a mixture consisting essentially of:

i) a zwitterionic monomer of the formula (V):



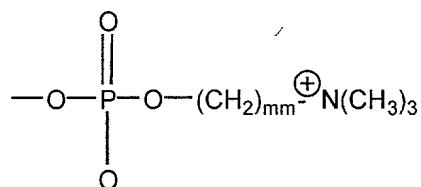
wherein BB is a straight or branched  $C_1$ - $C_6$  alkylene chain optionally interrupted by one or more oxygen atoms;

nn is from 1 to 12;

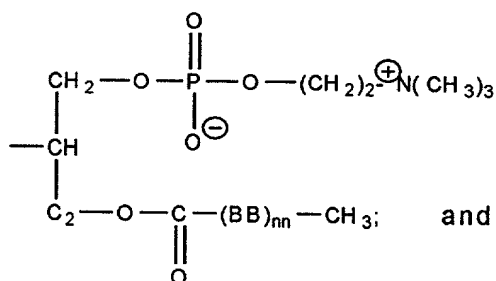
$R^{11}$  is H or a  $C_1$ - $C_4$  alkyl group; and

YY is a zwitterionic group which is selected from the group consisting of:

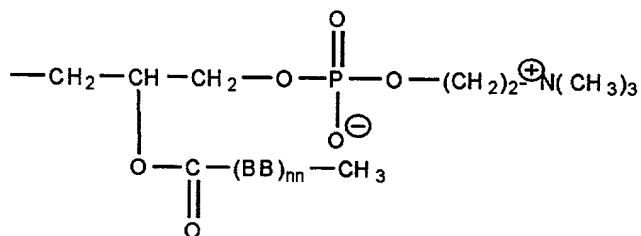
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VIC



(VID)



(VIE)

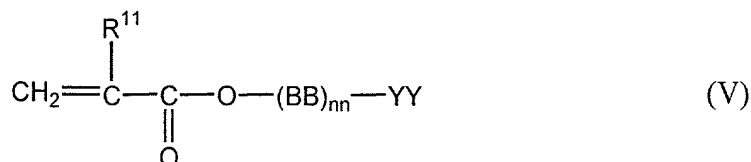
wherein mm is 1 to 4, nn is 1 to 12 and BB is a straight or branched C<sub>1</sub>-C<sub>6</sub> alkylene chain optionally interrupted by one or more oxygen atoms;

- ii) a non-ionic diluent monomer; and
- iii) a cross-linking monomer which forms cross-links during the polymerization reaction,

and water in an amount of from 30 to 80% by weight of the hydrogel.

45. A contact lens button formed of a xerogel comprising a cross-linked polymer obtained by polymerizing a mixture consisting essentially of:

- i) a zwitterionic monomer of the formula (V):

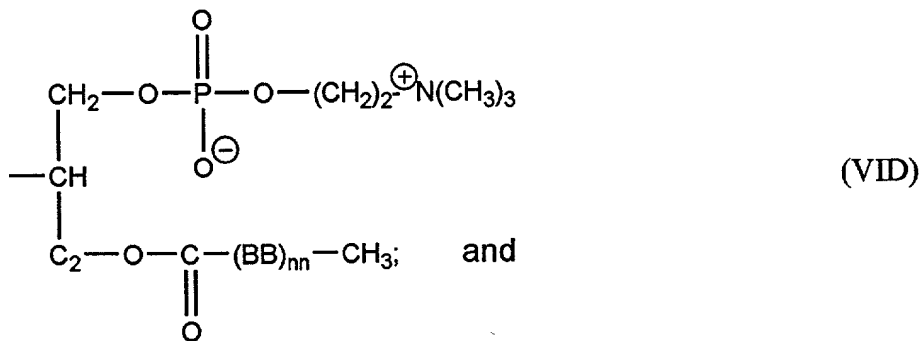
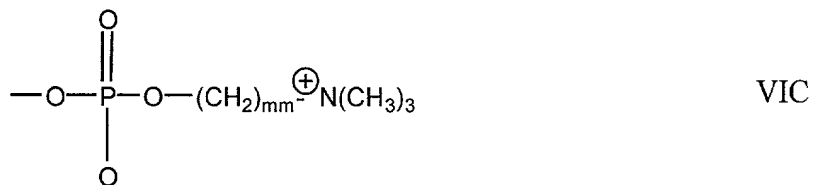


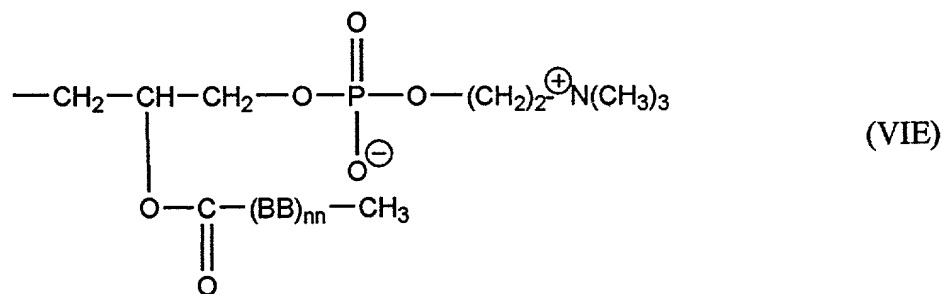
wherein BB is a straight or branched C<sub>1</sub>-C<sub>6</sub> alkylene chain optionally interrupted by one or more oxygen atoms;

nn is from 1 to 12;

R<sup>11</sup> is H or a C<sub>1</sub>-C<sub>4</sub> alkyl group; and

YY is a zwitterionic group which is selected from the group consisting of:





wherein mm is 1 to 4, nn is 1 to 12 and BB is a straight or branched C<sub>1</sub>-C<sub>6</sub> alkylene chain optionally interrupted by one or more oxygen atoms;

- ii) a non-ionic diluent monomer; and
- iii) a cross-linking monomer which forms cross-links during the polymerization reaction,

which is free of water.

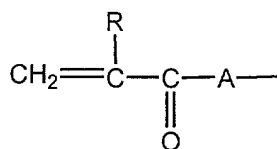
46. A contact lens material manufactured from a cross-linked polymer obtained by polymerizing a mixture consisting essentially of:

- i) a zwitterionic monomer of formula (I):

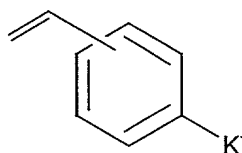


wherein B is a straight or branched alkylene, oxaalkylene or oligo-oxaalkylene chain or if X contains a carbon-carbon chain between B and the zwitterionic group or if K is joined to B via a carbon atom, a valence bond,

Y is an ethylenically unsaturated polymerizable group selected from:  
 wherein:



or



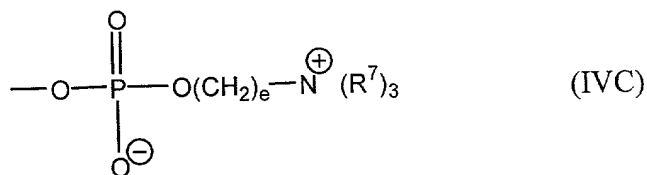
wherein:

R is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group;

A is -O- or -NR<sup>1</sup>- where R<sup>1</sup> is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group or R<sup>1</sup> is -B-X where B and X are as defined above; and

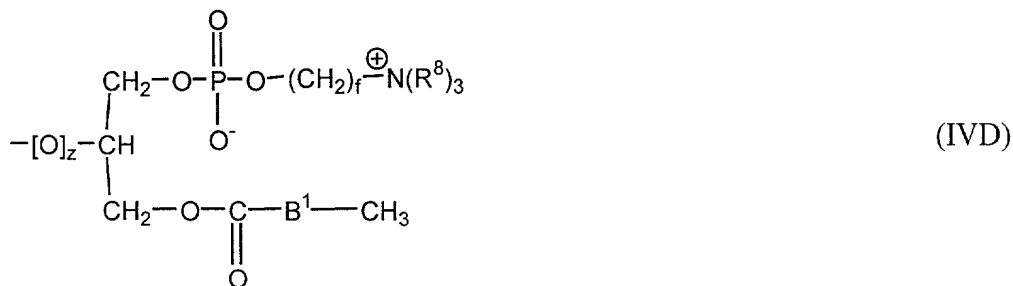
K is a group -(CH<sub>2</sub>)<sub>p</sub>OC(O)-, -(CH<sub>2</sub>)<sub>p</sub>C(O)O-, -(CH<sub>2</sub>)<sub>p</sub>OC(O)O-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)-, -(CH<sub>2</sub>)<sub>2</sub>C(O)NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)O-, -(CH<sub>2</sub>)<sub>2</sub>OC(O)NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sub>2</sub>C(O)NR<sup>2</sup>- (in which the groups R<sup>2</sup> are the same or different), -(CH<sub>2</sub>)<sub>2</sub>O-, -(CH<sub>2</sub>)<sub>2</sub>SO<sub>3</sub>-, or, optionally in a combination with B, a valence bond, and p is from 1 to 12 and R<sup>2</sup> is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group and

X is selected from the group consisting of groups of formula (IVC):



wherein the groups R<sup>7</sup> are the same or different and each is hydrogen or C<sub>1-4</sub> alkyl, and e is 1, 3 or 4;

groups of formula (IVD):



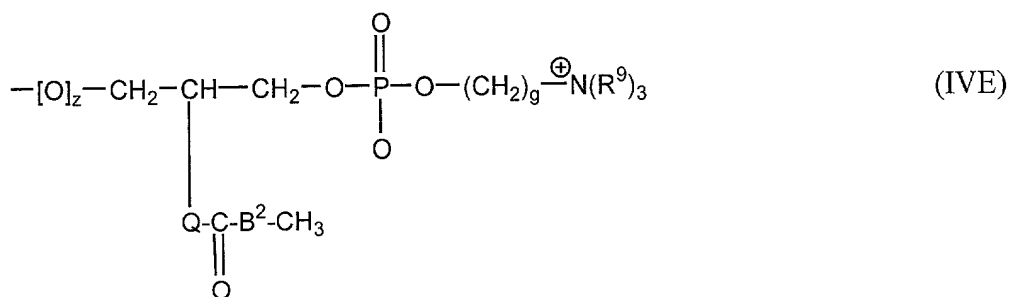
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wherein the groups  $R^8$  are the same or different and each is hydrogen or  $C_{1-4}$  alkyl,  $B^1$  is a valence bond or straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group,  $f$  is from 1 to 4 and if  $B$  is other than a valence bond,  $z$  is 1 and if  $B$  is a valence bond  $z$  is 0 if  $X$  is directly bonded to an oxygen or nitrogen atom and otherwise  $z$  is 1;

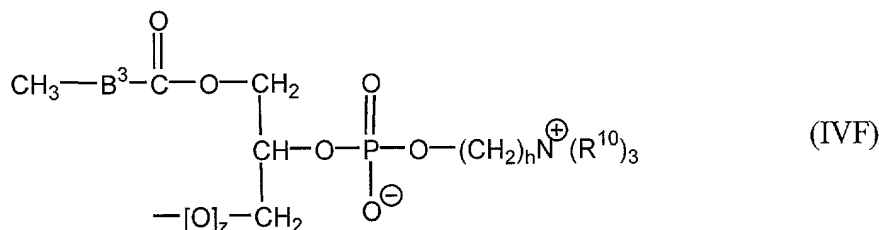
groups of formula (IVE):



wherein the groups  $R^9$  are the same or different and each is hydrogen or  $C_{1-4}$  alkyl,  $B^2$  is a valence bond or straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group,  $g$  is from 1 to 4 and if  $B$  is other than a valence bond,  $z$  is 1 and if  $B$  is a valence bond  $z$  is 0 if  $X$  is directly bonded to an oxygen or nitrogen atom and otherwise  $z$  is 1; and

groups of formula (IVF):

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wherein the groups  $\text{R}^{10}$  are the same or different and each is hydrogen or  $\text{C}_{1-4}$  alkyl,  $\text{B}^3$  is a valence bond or a straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group,  $h$  is from 1 to 4 if  $\text{B}$  is other than a valence bond,  $z$  is 1 and if  $\text{B}$  is a valence bond  $z$  is 0 if  $\text{X}$  is directly bonded to an oxygen or nitrogen atom and otherwise  $z$  is 1;

- ii) a non-ionic diluent monomer; and
- iii) a cross-linking monomer which forms cross-links during the polymerization reaction.

47. A contact lens material according to claim 46, in which the diluent monomer is selected from the group consisting of alkyl (alk)acrylates, dialkylamino alkyl (alk)acrylates, alkyl (alk)acrylamides hydroxyalkyl (alk)acrylates, N-vinyl lactams, styrene, substituted styrene, and mixtures thereof.

48. A contact lens material according to claim 47, in which the diluent monomer is selected from the group consisting of vinylpyrrolidone, 2-hydroxyethylmethacrylate, methylmethacrylate and mixtures thereof.

49. A contact lens material according to claim 46, in which  $\text{B}$  is an alkylene group of formula  $-(\text{CR}^3_2)_a-$ , wherein the groups  $-(\text{CR}^3_2)-$  are the same or different, and in each group  $-(\text{CR}^3_2)-$  the groups  $\text{R}^3$  are the same or different and each group  $\text{R}^3$  is hydrogen or  $\text{C}_1\text{-C}_4$  alkyl, and  $a$  is from 1 to 12;

an alkoxyalkyl group having 1 to 6 carbon atoms in each alkyl moiety;



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an oligo-oxaalkylene group of formula  $-(\text{CR}^4_2)_b\text{O}(\text{CR}^4_2)_c-$  where the groups  $-(\text{CR}^4_2)-$  are the same or different and in each group  $-(\text{CR}^4_2)-$  the groups  $\text{R}^4$  are the same or different and each group  $\text{R}^4$  is hydrogen or  $\text{C}_1\text{-C}_4$  alkyl, and  $b$  is 2 or 3 and  $c$  is from 2 to 11,

or if  $X$  contains a carbon-carbon chain between  $B$  and the center of positive charge, or if  $K$  is joined to  $B$  via a carbon atom, a valence bond.

49 50. A contact lens material according to claim 46, in which the group  $X$  is a group of formula (IVC).

51. A contact lens material polymer according to claim 50, wherein the groups  $\text{R}^7$  are all methyl.

52. A contact lens material according to claim 46, in which cross-linking monomer is a bifunctional or trifunctional cross-linking agent.

53. A contact lens material according to claim 52, in which the cross-linking agent is selected from the group consisting of ethyleneglycoldimethacrylate, trimethylolpropanetrimethacrylate and  $\text{N,N}'$ -methylenebisacrylamide.

57 54. A contact lens formed of a hydrogel comprising a cross-linked polymer obtained by polymerizing a mixture consisting essentially of:

i) a zwitterionic monomer of formula (I):

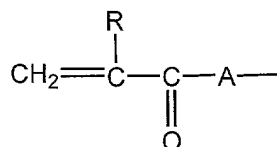


wherein  $B$  is a straight or branched alkylene, oxaalkylene or oligo-oxaalkylene chain or if  $X$  contains a carbon-carbon chain between  $B$  and the zwitterionic group or if  $K$  is joined to  $B$  via a carbon atom, a valence bond,

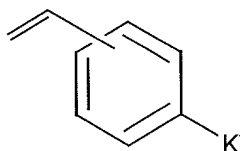
$Y$  is an ethylenically unsaturated polymerizable group selected from:

wherein:

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or



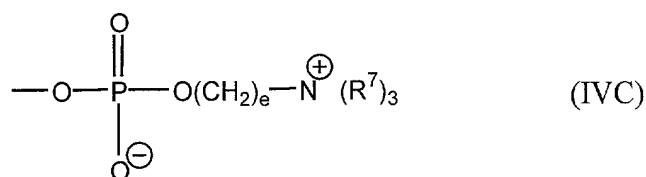
wherein:

R is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group;

A is -O- or -NR<sup>1</sup>- where R<sup>1</sup> is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group or R<sup>1</sup> is -B-X where B and X are as defined above; and

K is a group -(CH<sub>2</sub>)<sub>p</sub>OC(O)-, -(CH<sub>2</sub>)<sub>p</sub>C(O)O-, -(CH<sub>2</sub>)<sub>p</sub>OC(O)O-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)-, -(CH<sub>2</sub>)<sub>2</sub>C(O)NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)O-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)O-, -(CH<sub>2</sub>)<sub>2</sub>OC(O)NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sub>2</sub>C(O)NR<sup>2</sup>- (in which the groups R<sup>2</sup> are the same or different), -(CH<sub>2</sub>)<sub>2</sub>O-, -(CH<sub>2</sub>)<sub>2</sub>SO<sub>3</sub>-, or, optionally in a combination with B, a valence bond, and p is from 1 to 12 and R<sup>2</sup> is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group and

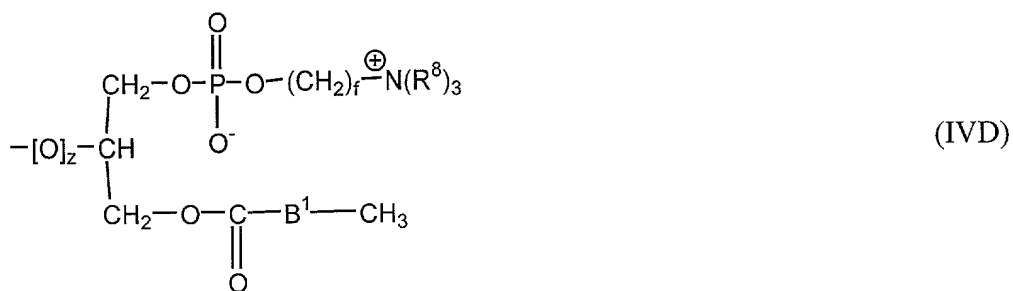
X is selected from the group consisting of groups of formula (IVC):



wherein the groups R<sup>7</sup> are the same or different and each is hydrogen or C<sub>1-4</sub> alkyl, and e is 1, 3 or 4;

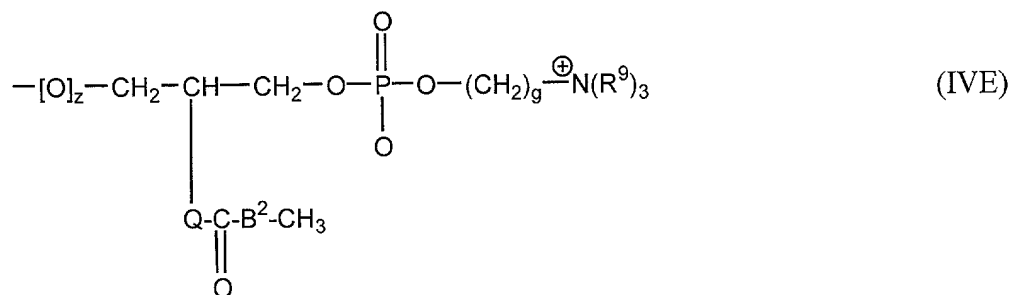
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groups of formula (IVD):



wherein the groups  $\text{R}^8$  are the same or different and each is hydrogen or  $\text{C}_{1-14}$  alkyl,  $\text{B}^1$  is a valence bond or straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group,  $f$  is from 1 to 4 and if  $\text{B}$  is other than a valence bond,  $z$  is 1 and if  $\text{B}$  is a valence bond  $z$  is 0 if  $\text{X}$  is directly bonded to an oxygen or nitrogen atom and otherwise  $z$  is 1;

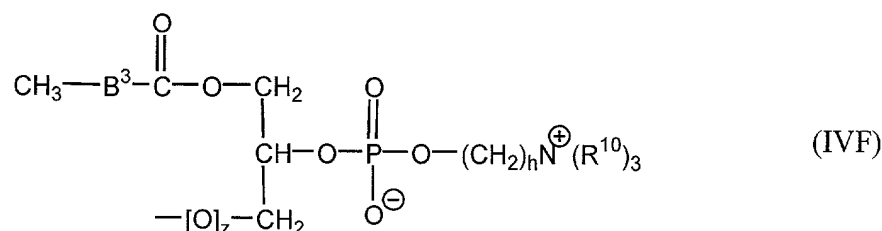
groups of formula (IVE):



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wherein the groups  $R^9$  are the same or different and each is hydrogen or  $C_{1-4}$  alkyl,  $B^2$  is a valence bond or straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group, g is from 1 to 4 and if B is other than a valence bond, z is 1 and if B is a valence bond z is 0 if X is directly bonded to an oxygen or nitrogen atom and otherwise z is 1; and

groups of formula (IVF):



wherein the groups  $R^{10}$  are the same or different and each is hydrogen or  $C_{1-4}$  alkyl,  $B^3$  is a valence bond or a straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group, h is from 1 to 4 if B is other than a valence bond, z is 1 and if B is a valence bond z is 0 if X is directly bonded to an oxygen or nitrogen atom and otherwise z is 1;

- ii) a non-ionic diluent monomer; and
- iii) a cross-linking monomer which forms cross-links during the polymerization reaction,

and water in an amount of from 30 to 80% by weight of the hydrogel.

55. A contact lens button formed of a xerogel comprising a cross-linked polymer cross-linked polymer obtained by polymerizing a mixture consisting essentially of:

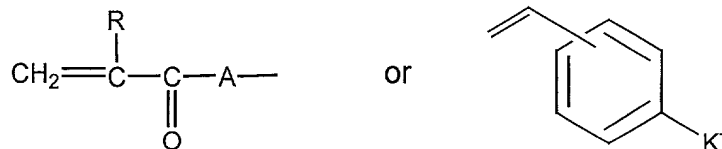
- i) a zwitterionic monomer of formula (I):



wherein B is a straight or branched alkylene, oxaalkylene or oligo-oxaalkylene chain or if X contains a carbon-carbon chain between B and the zwitterionic group or if K is joined to B via a carbon atom, a valence bond,

Y is an ethylenically unsaturated polymerizable group selected from:

wherein:



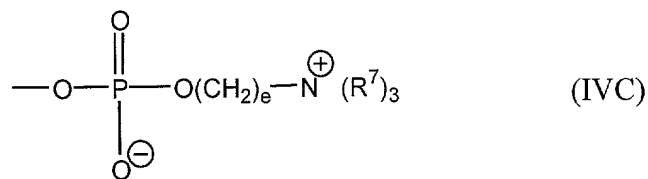
wherein:

R is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group;

A is -O- or -NR<sup>1</sup>- where R<sup>1</sup> is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group or R<sup>1</sup> is -B-X where B and X are as defined above; and

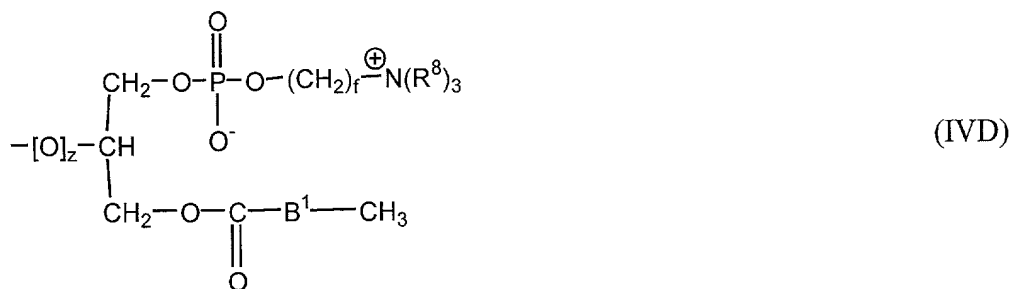
K is a group -(CH<sub>2</sub>)<sub>p</sub>OC(O)-, -(CH<sub>2</sub>)<sub>p</sub>C(O)O-, -(CH<sub>2</sub>)<sub>p</sub>OC(O)O-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)-, -(CH<sub>2</sub>)<sub>2</sub>C(O)NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)O-, -(CH<sub>2</sub>)<sub>2</sub>NR<sup>2</sup>C(O)O-, -(CH<sub>2</sub>)<sub>2</sub>OC(O)NR<sup>2</sup>-, -(CH<sub>2</sub>)<sub>2</sub>NR<sub>2</sub>C(O)NR<sup>2</sup>- (in which the groups R<sup>2</sup> are the same or different), -(CH<sub>2</sub>)<sub>2</sub>O-, -(CH<sub>2</sub>)<sub>2</sub>SO<sub>3</sub>-, or, optionally in a combination with B, a valence bond, and p is from 1 to 12 and R<sup>2</sup> is hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl group and X is selected from the group consisting of groups of formula (IVC):

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wherein the groups  $\text{R}^7$  are the same or different and each is hydrogen or  $\text{C}_{1-4}$  alkyl, and  $e$  is 1, 3 or 4;

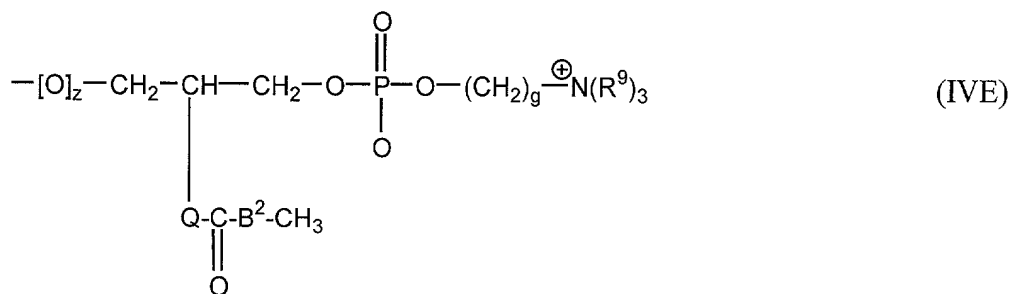
groups of formula (IVD):



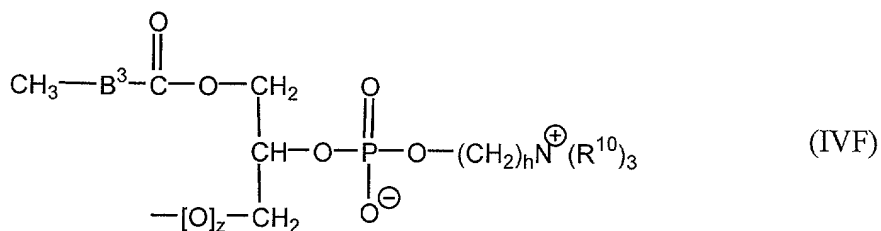
wherein the groups  $\text{R}^8$  are the same or different and each is hydrogen or  $\text{C}_{1-4}$  alkyl,  $\text{B}^1$  is a valence bond or straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group,  $f$  is from 1 to 4 and if  $\text{B}$  is other than a valence bond,  $z$  is 1 and if  $\text{B}$  is a valence bond  $z$  is 0 if  $\text{X}$  is directly bonded to an oxygen or nitrogen atom and otherwise  $z$  is 1;

groups of formula (IVE):

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wherein the groups  $\text{R}^9$  are the same or different and each is hydrogen or  $\text{C}_{1-4}$  alkyl,  $\text{B}^2$  is a valence bond or straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group,  $g$  is from 1 to 4 and if  $\text{B}$  is other than a valence bond,  $z$  is 1 and if  $\text{B}$  is a valence bond  $z$  is 0 if  $\text{X}$  is directly bonded to an oxygen or nitrogen atom and otherwise  $z$  is 1; and groups of formula (IVF):



wherein the groups  $\text{R}^{10}$  are the same or different and each is hydrogen or  $\text{C}_{1-4}$  alkyl,  $\text{B}^3$  is a valence bond or a straight or branched alkylene, oxaalkylene or oligo-oxaalkylene group,  $h$  is from 1 to 4 if  $\text{B}$  is other than a valence bond,  $z$  is 1 and if  $\text{B}$  is a valence bond  $z$  is 0 if  $\text{X}$  is directly bonded to an oxygen or nitrogen atom and otherwise  $z$  is 1;

- ii) a non-ionic diluent monomer; and
- iii) a cross-linking monomer which forms cross-links during the polymerization reaction


which is free of water.

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**REMARKS**

Entry and consideration of this Amendment is respectfully requested.

Respectfully submitted,

  
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John T. Callahan  
Registration No. 32,607

SUGHRUE MION, PLLC  
2100 Pennsylvania Avenue, N.W.  
Washington, D.C. 20037-3213  
Telephone: (202) 293-7060  
Facsimile: (202) 293-7860

Date: February 28, 2002

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**APPENDIX**

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS:**

Claims 1-16 are canceled.

Claims 17-55 are added as new claims

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